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(54) Title of the Invention
Toilet sand for pets

(57)
[Summary]
[Purpose]

To obtain a toilet sand for a pet which is easy to handle and has high absorption and deodorant properties to urine and produces clumps immediately by urine, while being economical, by making the size of clump small, being light per se.

[Composition]
A fine-ground sodium bentonite and calcium bentonite are mixed at the ratio of 5:5, and the said sodium bentonite mixtures and the foaming perlite whose particle diameter is 0.1mm-1mm are mixed in the ratio of former: latter=85:15.

The obtained granulated materials of this method are charged into a kneader and water is added while being kneaded.

Water quantity to be added is 25%.

Granulated materials containing water in a kneader are granulated to large and small powders.

The produced granular materials containing water are charged into a rotary drier and are tumbled and dried by hot wind while being transported.

[Claim]

[Claim 1]

Toilet sand for pets granulated in porous granular material by materials that is obtained by adding a foaming perlite whose particle diameter is 0.05-2mm to a fine-ground natural benetonite of 30% or less as the main ingredients and adding the other ingredient of 10% or less to these.

[Description]

[0001]

[Field of the Invention]

This invention relates to the toilet sand for pets used as seat material of the toilet of pets, such as a cat and a dog.

[0002]

[Prior Arts]

Although kinds of toilet sand for pets have been proposed or have come to be sold, the following technology which this inventor proposed is particularly excellent (it is only called the conventional technology Provisional Publication No. 1-No. 312945 and the following).

That is produced by that fine-ground natural bentonite as the main ingredients and toilet sand for a pet granulated to porous granular material by materials obtained with allowing adding the other fine-ground which does not exceed 10%, and the natural bentonite was fine-ground and the obtained fine-ground bentonite was kneaded while water was added, and the obtained bentonite granular material was dried while being tumbled by a tumbling-drying method.

[0003]

Naturally, the said prior arts were developed with the aim of solving problems of the previous technology and to understand that, prior arts are mentioned.

The first is a toilet sand for a pet which natural bentonite in Gunma being sold from that time to present.

The second is that bentonite and fiber powder were combined and water-soluble paste agent was added, and mixed. These were the processing material of excrement for a pet granulated to powdery and pellet. (Japan Unexamined Patent Publication Showa 60-102128).

The third is toilet sand for a pet that granulated easily if put into water, and that grinding a water-absorptive mineral finely, water or a small amount of binder is added to this. After kneading, granulating, and drying out, promcinnam aldehyde solution was sprayed and dried or

Promcinnam aldehyde and water or water and a small amount of binder were added to the said fine-grinded mineral (Japan Patent Application Showa61-34779)

The forth is the seating material for animals toilet (Japan Unexamined Patent Publication Showa 62-130630) comprising mixture of powder material, as necessity, about 0.3-10mm mainly consisting of clayey mineral and powder material about 1-10mm consisting of zeolite.

[0004]

[Problem to be Solved by the Invention]

The said prior arts comprise the following problems.

The first is that natural bentonite was merely crushed so that its absorption is not that high.

Although clumps were produced if it absorbed water, adhesive power was not enough and it would collapse shortly after being pushed and amount of that being clumps is much.

The second is that when pets urinate, even if it was absorbed, strong adhesive power was not produced.

Therefore, a clump was not produced.

Therefore, since it is difficult to choose only it to remove only the processing material absorbed even if urinary absorption was high, it is hard to say that it is easy.

Moreover, since it cakes firmly the shape of a pellet, and in the shape of a grain, urinary absorption cannot be said to be so high as compared with the crushed bentonite grain which showed as the fist of the toilet sand for the pets before it, i.e., former technology.

The said third is to granulate an absorption nature mineral in suitable form with a granulate machine, considered from the function of a granulate machine, formed powder would be in a caking state.

Therefore, water absorption ability was not so improved compared to that of merely crushed bentonite grain shown as the first of prior arts.

The said forth is merely mixture of the granular material and zeolite and was not planned to improve water absorption, so that it cannot have the water absorption capability more than the average value of the water absorption capability in those simple substances.

Moreover, in publication in which these arts were written, in the case where moisture like urine was poured on it, it did not clump sufficiently in an experiment of this inventor, and the result which collapses easily was obtained.

[0005]

The said prior arts aimed to solve the above-said problems of the prior arts, to increase absorption of the moisture like pets' urine while improving deodorization power, to form easily

removable toilet sand only when covered by urine and to make small yielded clump quantity and is economical.

Furthermore, it melts in water well and passing to a toilet also makes for the purpose of obtaining a possible pet's toilet sand.

[0006]

This invention is aimed to, while improving the above-mentioned prior arts, secure the absorption of even more urine, maintain high deodorization power, and to produce a clump promptly with urine, being economical by making the amount of clumps small and to obtain light toilet sand, which is easy to handle.

[0007]

[The means for solving a subject]

The place made into the summary of this invention is toilet sand for pets which granulate(ed) in the porous granular thing with the materials with which 30% or less of particle diameter adds the foaming perlite which is 0.05mm - 2mm, and is further obtained by them by permitting addition of the ingredient of 10% or less of others with the fine-ground natural bentonite which are the main ingredients.

The main thing of this invention is toilet sand for a pet granulated to porous granular material by material to which the foaming perlite whose 30% of particle diameter is 0.05mm-2mm was added to fine-ground natural bentonite as the main ingredients and to which less than 10% of the other material were added.

[0008]

As for the said natural bentonite, one yielded in various places may be used.

As for this, both a sodium bentonite and a calcium bentonite can be used

Rather than either one is used, it is better to use a sodium bentonite and a calcium bentonite at a suitable combination rate, considering adhesive power or clump generation power, suction, to name just a few when urine is dropped.

That is, the proportion of a sodium bentonite is heightened to increase the clump generation power, and that of calcium bentonite is increased for raising water absorption power.

Moreover, what was ground to fine pulverization, i.e., detailed powder, is used for the said natural bentonite.

Such bentonite of fine powders can be ground with a suitable pulverization means, or powders produced during the process which obtains powder can be sifted out and be obtained.

[0009]

As for the said foaming perlite, if particle diameter exceeding 2mm is used, it is exposed on the surface of powders after granulating to toilet sand so that appearance is bad and powder is too light that the clump generation power declines, therefore it is not suitable for toilet sand.

If appearance specific gravity of powders becomes too small, it is easy for the sands to attach to a cat's leg so that it accrues problem that sands come outside.

Moreover, as for the said foaming perlite, if particle diameter below 0.05mm is used, obtained powder after granulation almost does not differ from the case of granulating fine bentonite with respect to appearance specific gravity, thus it does not decline in the least.

This is presumed due to the small foaming perlite of particle diameter and a fine powders bentonite to join together too much densely.

In addition, there is a problem of water absorption being not good.

Therefore, it is not suitable for toilet sand.

[0010]

The above-mentioned foaming perlite will go into the desirable range in adhesive power (or clump generation power), deodorization power, etc. at the time of the ability to cover the appearance specific gravity of powders obtained, water absorption capability, and urine, when particle diameter used is in the range of 0.05mm - 2mm, as described above.

As for the said foaming perlite, as mentioned, if that of particle diameter in the range of 0.05mm-2mm are used, the appearance specific gravity of powders obtained, water absorption capability, adhesive power (or briquette/clump generation power) and deodorization power of obtained powder are within the desirable range.

When particle diameter uses the thing in the range of 0.1mm - 1mm especially, the best result is obtained in the appearance specific gravity and others of powders obtained.

That is, appearance specific gravity is 0.48 and becomes about 74% of that in case of granulating by bentonite with the prior arts, being suitable for toilet sand and easy to handle.

Moreover, water absorption capability is about 1.5 times as large as one granulated by bentonite with the said prior arts with respect to the comparison of the testing result as to salt water.

Although the clump produced when covered with urine is a little soft, as to adhesive power and clump generation speed, it is almost equivalent and is completely satisfactory.

As for deodorization power, it is almost equivalent to what bentonite was granulated by the said prior arts or is somewhat better than that.

[0011]

In addition, although wood powder, paper powder, etc. were tested other than the above-mentioned firing perlite, when wood powders were added to the above-mentioned bentonite, and granulate(ed) to porosity and when the adhesive power generated when urine is added is weak, there is a problem from which sufficient clumping is not obtained. When paper powders are similarly added to a bentonite and it is granulated to porosity, there is a problem that the adhesive power generated when appearance specific gravity becomes small is too much and moreover increasing urine is inadequate, and it is inadequate.

In addition, wood powder, paper powder, to name just a few other than the said foaming perlite were tested, one which wood powder was added to the said bentonite and was granulated porosity is weak in terms of adhesion yielded in the case of adding urine and sufficient clumping can not be obtained. When paper powder was added to bentonite and granulated porosity, appearance specific gravity became too small, and adhesion yielded in the case of adding urine is not enough, therefore neither one is hard to apply.

[0012]

Moreover, as ingredients other than the above-mentioned natural bentonite and foaming perlite, ingredients, such as various deodorants and a disinfectant, are mixable.

Some zeolite and so on may be added.

However, ingredients other than these natural bentonites and foaming perlites can be mixed only in the range to 10% as mentioned above.

It is because a bad influence would be produced in formation of the clump at the time of absorbing urine by the ingredient or appearance specific gravity would exceed the optimal range.

[0013]

By the way, the said toilet sand for pets can be manufactured as follows.

The bentonite fine-ground is prepared first.

This is fine-ground when the natural bentonite before pulverization comes to hand.

It is good to adopt a sodium bentonite and a calcium bentonite at a suitable rate in consideration of clump generation power, suction, and so on by urine.

In addition, when fine-grinding a natural bentonite, it is not inconvenient even if it uses such a means for the reason.

It can be performed using a common grinder.

30% or less of foaming perlite is added to the obtained fine pulverization bentonite .

As for the said foaming perlite, as described above, one whose particle diameter is in the range of 0.05mm - 2mm is used.

As for the fine pulverization bentonite to which foaming perlite was added, it may mix fine pulverization minerals, such as zeolite in the range of 10% or less if needed.

[0014]

Granulated material obtained by adding a foaming perlite to the said fine pulverization bentonite or granulated material to which some additive was added are charged into a kneader and 20-30% of water to the said granulated material is added.

The quantity of water is determined observing not only this but a state of kneading.

That is, due to a granular material starting to form immediately after water is added to granulated material while being kneaded by a kneader, the supply of water is to be adjusted as that diameter not exceeding 5mm.

The sate of water to be added is equalized, and this knead is continued until the averaged granular material comes to be formed.

If it is knead by a kneader, it is appropriate to repeat to two steps or three steps in general.

Since the granular material formed at this time is kneaded and formed without applying pressure, it serves as porous powders comprising many cavities inside.

[0015]

Subsequently, the said granular material is charged into a rotary drier as a suitable quantity, sending in a hot wind, and is made to dry gradually.

In this way, the said granular material constitutes porous powder without applying pressure, avoiding being fat.

In this way, it can granulate in the porous granular material comprising many cavities inside very simply only by adding water while being kneaded without applying pressure.

After that, certain dryness can be performed by rotating while drying with hot wind.

Particle diameter about 1-5mm is obtained by sifting the dry granular material.

Even if particle diameter is the largest than this a little, there is no such problem.

As for obtained powders, appearance specific gravity becomes about 0.48-0.53.

[0016]

[Action]

Therefore, toilet sand for a pet is used as seating material of pet's toilet like that of general.

Since that is constituted in porosity by adding bentonite to a foaming perlite, in that case, water absorption is very high so that about 90-110% of water absorption capability is comprised in case where urine is covered.

Therefore, if water absorption is compared with the natural bentonite grain which crushed the fine pulverization bentonite about 1.5 times is compared with that granulate(ed) to porosity with the above-mentioned conventional technology, it will improve to 3 or more times in general.

Therefore, its water absorption is about 1.5 times improved as the one granulated making fine pulverization bentonite porosity by the said prior arts and is more than three times as improved as crushed natural bentonite.

Thus, since the water absorption improved very much, a pet's urine will be absorbed well and urine will be certainly confined in the inside of toilet sand.

Moreover, although it comprises deodorization power with somewhat almost equivalent to the toilet sand (or zeolite powder of the amount of said) by the said prior arts, this is presumed that it is the reason to confine urine in the inside of toilet sand certainly like what is depended on the prior arts.

On the other hand, if urine is added, adhesive power strong against both powder of the toilet sand which absorbed this will increase and solidify in the shape of a clump.

By removing the clump of toilet sand, only the toilet sand which absorbed urine can be removed alternatively easily.

[0017]

[Execution Example]

Execution Example 1

The sodium bentonite and calcium bentonite which were fine-ground are prepared.

The rate of the former and the latter is set to be 5:5.

The foaming perlite whose particle diameter is 0.1-1mm is added to obtained fine pulverization bentonite (mixture in the above-mentioned rate of a sodium bentonite and a calcium bentonite) in the ratio of 85%:15%, the former and the latter respectively.

Furthermore, granulated material obtained by such a way is charged into the first step of a kneader and is kneaded while adding water.

Quantity of water to be added is about 25% to granulate materials.

Granulated material comprising water in a kneader is granulated to large and small powder.

Granular material produced by such a way is transferred from the said first step of a kneader to the second step of a kneader and it is kneaded further.

Then, the said granular material comprising moisture is charged into a rotary drier one by one and is tumbled and dried by hot wind while being rotated.

Subsequently, the said granular material being dried is sifted to 15mm powder.

[0018]

Execution Example 2

The sodium bentonite, the calcium bentonite, and clay which pulverising was carried out are prepared respectively.

Among those, the rate of a sodium bentonite and a calcium bentonite is set to 6:4.

The obtained fine pulverization bentonite (mixture in the above-mentioned rate of a sodium bentonite and a calcium bentonite) and fine pulverization clay and 0.05 mm-1mm of the foaming perlite of the particle diameter are mixed at the rate which is fine pulverization bentonite: fine pulverization clay: foaming perlite = 80:5:15, and the obtained granulate materials is charged to the first step of a kneader, and water is added while kneading.

The added water amount may be about 25% to granulate materials.

The granulate materials which is moisture in a kneader are made granular to a large and small grain.

In this way, the produced granular substance is moved from the above-mentioned first step of a kneader to the second step of a kneader, and it is kneaded further.

Then, the above-mentioned granular substance which is moisture is charged to a rotary drier one by one, and hot wind dryness is carried out while tumbling and transporting it.

Subsequently, the above-mentioned granular substance which hot wind dryness was carried out is sifted out to 1-5mm of granular.

[0019]

Conventional Example 1

(The first example by the above-mentioned conventional technology)

The fine pulverization sodium bentonite is charged to the first step of a kneader, and water is added while kneading.

The adding water amount may be about 25% to knead substance.

Knead substance which is moisture in a kneader is made granular to large and small granular.

In this way, the produced granular substance is moved from the above-mentioned first step of a kneader to the second step of a kneader, and it is kneaded further.

Then, the above-mentioned granular substance which is moisture is charged to a rotary drier one by one, and hot wind dryness is carried out while tumbling and transporting it.

Subsequently, the above-mentioned granular substance which hot wind dryness was carried out is sifted out to 1-5mm of granular.

[0020]

Conventional Example 2

(The second example by the above-mentioned conventional technology)

a fine pulverization sodium bentonite and fine pulverization clay is mixed at the rate of 95:5, and the obtained granulate materials are charged to the first step of a kneader, and water is added while kneading.

The adding water amount may be about 25% to granulate materials.

The granulate materials which is moisture in a kneader are made granular to a large and small grain.

In this way, the produced granular substance is moved from the above-mentioned first step of a kneader to the second step of a kneader, and it is kneaded further.

Then, the above-mentioned granular substance which is moisture is charged to a rotary drier one by one, and hot wind dryness is carried out while tumbling and transporting it.

Subsequently, the above-mentioned granular substance which hot wind dryness was carried out is sifted out to 1-5mm of granular.

[0021]

Conventional Example 3

This is a commercial pet's toilet sand, and this is just the one which the natural bentonite from Gumma was crushed to suitable particle diameter as toilet sand by the crusher.

[0022]

Next, the examination result about the quality of the above Execution Example 1 and 2 and the Conventional Examples 1, 2, and 3 is shown.

[Nature Comparison Table 1]

Object	Absorption nature		Absorption nature		Solidifying nature	
	Required quantity of absorption of 20 cc of salt water g	Absorption %	The vertical length of the generation clod at the time of pouring 20 cc of	Comparison of the conventional length of a generation clod	The result of clod pressure with the finger after adding salt water.	The result of pressure at the time of 48hr progress after adding salt water.

			salt water cm			
Execution Example 1	18.0	111.1	2.5	100	It is crushed without collapsing.	It is crushed and becomes board- shaped.
Execution Example 2	22.0	90.9	3.0	120	It is crushed without collapsing.	It is crushed and becomes board- shaped.
Conventional Example 1	28.0	71.4	3.5	140	It is crushed without collapsing.	It is crushed and becomes board- shaped.
Conventional Example 2	35.0	57.1	4.7	188	It is crushed without collapsing.	It is crushed and becomes board- shaped.
Conventional Example 3	66.0	30.3	6.5	260	It is collapsed and returns to a grain.	It is crushed and returns to a grain.

Absorption 1:

The sample was put into the beaker, 20 cc of salt water was poured into from the top, the weight of the portion which solidified was measured, and the weight value of salt water was deducted from this weight value.

Absorption 2:

The length of the depth direction of a solid sample (clod) at the examination of Absorption 1 was measured.

30 Moreover, comparison of the conventional length of a generated clod is comparison of the length of the above-mentioned depth direction, and it is a numerical value at the time which Execution Example 1 is considered as 100.

Solidification nature:

The clod of a sample which was obtained by the examination of Absorption 1 was inserted and pressed with the finger respectively after pouring salt water immediately and after 48Hr progress, and how to be collapsed or how to be crushed was observed.

[0023]

[Nature Comparison Table 2]

Object	Appearance specific gravity	Deodorization nature		
		After 10 minutes	After 20 minutes	After 40 minutes
Execution Example 1	0.48	20ppm	0ppm	0ppm
Execution Example 2	0.53	35ppm	15ppm	0ppm
Conventional Example 1	0.65	30ppm	10ppm	0ppm
Conventional Example 2	0.75	40ppm	20ppm	0ppm
Conventional Example 3	0.95	300ppm	110ppm	30ppm

Deodorization nature:

It is the ammonia gas concentration which the sample was put into the plugged container, 0.1g of 10% ammonia solution was dropped, and it is measured after 10 minutes, 20 minutes, and 40 minutes.

[0024]

Therefore, when carrying out comprehensive evaluation in which the above comparison result of the nature comparison table (1) and (2) was judged synthetically, it is as follows.

[Table 3]

Object	Execution Example 1	Execution Example 2	Conventional Example 1	Conventional Example 2	Conventional Example 3
Comprehensive evaluation	Excellent	Good	Good	almost good	Poor

[0025]

Thus, speaking generally, as shown in the above nature comparison table (1) and (2), the toilet sand obtained in the above Execution Example 1 and 2 have nature as follows.

1

Water absorption capability is very high, and it has about 90% - 110% of absorption of the weight.

This is about 1.5 times compared with the above-mentioned conventional technology, and this is more than 3 times of absorption of the natural bentonite grain which is one of the former technologies.

Moreover, as a result of that absorption capability is very high, since urine is confined inside of toilet sand, the good deodorization effect arises.

This is almost equivalent to what is made by the above-mentioned conventional technology, or is good somewhat.

2

If moisture such as urinary is poured, adhesive power is produced, and adjoining mutual granular is combined instantaneously. Moreover, it does not collapse easily even if time goes by.

This is almost equivalent to what is made by the above-mentioned conventional technology.

Although the clod generated is a little softer than what is made by the above-mentioned conventional technology, it is not the softness which becomes a problem practically.

3

Appearance specific gravity is 0.48-0.53.

By the way, what is made by the above-mentioned conventional technology is 0.65-0.75, and a natural bentonite grain of former technology is about 0.95. So, it becomes very lightweight as compared with these, and its convenience on conveyance is good, and it is also easy to handle.

Furthermore, absorptive power is high as mentioned above, so there is also an advantage whose quantity of discard-needed toilet sand in which urine was absorbed.

Thus, although it is used by spreading with about 5cm - 6cm of thickness for the toilet for pets which is box - shaped whose four side length is 40cm, depth is 10cm, as mentioned above, it is very good from any viewpoint of urinary absorption nature, deodorization nature, and clod formation by urine.

[0026]

[The effect of invention]

Compared with what is made by the above-mentioned conventional technology, the toilet sand for pets of this invention is of far lighter weight, and its absorption is increased, and it has more than equivalent deodorization power.

Moreover, clod formation by urine etc. occurs promptly, and it does not collapse easily by progress of time.

As mentioned above, since the toilet sand for pets of this invention has the very high absorption, the quantity of the toilet sand which becomes a clod as a result of increased water absorption less as compared with what is made by the above-mentioned conventional technology.

At the time of use, since only the little amount of toilet sand which becomes a clod is abandoned, and it is just needed to add the amount which is equivalent to this at any time, it is also more economical.

Moreover, since there are no sharp angles in the grain, there is also an advantage of not hurting the feet of pets, such as cats.